

Appl. No. 10/815,201

Attorney Docket No.: N1280-00180 (TSMC2003-1083)

Reply dated: 07/20/2006

Response to Office Action of: 04/20/2006

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings of claims in the application.

1. (Currently Amended) A semiconductor contact connection structure comprising:
- an insulator substrate;
  - a first semiconductor device formed on the insulator substrate;
  - a non-conducting gate interconnect layer formed on the insulator substrate for connecting to a gate of a second semiconductor device formed on the insulator substrate; and
  - a silicide layer formed on the gate interconnect layer, and an active region of the first semiconductor device for making a connection thereof, wherein the silicide layer is a sidewall butted connection structure that bridges a dielectric edge portion separating the gate interconnect structure from the active region and the silicide layer is a continuous layer including a junction covering the dielectric edge portion and consisting of a first silicide film formed of silicon from the gate interconnect layer and a second silicide film formed of silicon from the active region, wherein the active region serves as a local connection layer between the first and second semiconductor devices.
2. (Cancelled)
3. (Original) The connection structure of claim 1 wherein the silicide layer further covers a sidewall of the gate interconnect.
4. (Original) The connection structure of claim 1 wherein the first semiconductor device is formed on a silicon based material layer on the insulator substrate wherein the silicon based material layer has a thickness of more than 20 angstroms.

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1 5. (Cancelled)

1 6. (Original) The connection structure of claim 1 wherein the silicide layer is less  
2 than 350 angstroms in thickness.

1 7. (Original) The connection structure of claim 1 wherein the silicide layer provides  
2 an electrical resistance of 100 ohm/ea, or less, between the gate interconnect layer and  
3 the active region.

1 8. (Currently Amended) An SRAM cell formed on an insulator substrate, the cell  
2 comprising:

3 at least one active region formed on the insulator substrate and with a  
4 continuous silicide layer formed thereon serving as an intra-cell connection layer  
5 connecting drain nodes of at least a PMOS transistor and an NMOS transistor formed  
6 on the insulator substrate, the two transistors forming a first inverter;

7 said continuous silicide layer further forming a sidewall butted connection  
8 structure used in conjunction with a gate interconnect layer and connecting the drain  
9 nodes of the transistors of the first inverter to gates of at least two transistors of a  
10 second inverter,

11 wherein the continuous silicide layer consists of a first silicide film formed of  
12 silicon from the active region and a second silicide film formed of silicon from the gate  
13 interconnect layer.

1 9. (Original) The cell of claim 8 wherein the active region further connects to a  
2 source node of at least one pass gate.

1 10. (Original) The cell of claim 9 wherein the pass gate's drain node is connected to  
2 an access line.

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1 11. (Original) The cell of claim 8 further comprising a first metal layer for forming  
2 wordline metal straps and landing pads for power supply lines and access lines.

1 12. (Original) The cell of claim 11 further comprising a second metal layer for forming  
2 power supply lines and access lines.

1 13. (Original) The cell of claim 12 wherein the access lines are interposed between  
2 the power supply lines.

1 14. (Original) The cell of claim 11 wherein lines on the first and second metal layers  
2 are arranged in a substantially perpendicular fashion.

1 15. (Currently Amended) An SRAM cell formed on an insulator substrate, the cell  
2 comprising:

3 a first inverter having a first PMOS transistor and a first NMOS transistor;

4 a second inverter having a second PMOS transistor and a second NMOS  
5 transistor; and

6 a sidewall butted connection structure used in conjunction with a gate  
7 interconnect layer for connecting drain nodes of the transistors of the first inverter  
8 formed on an active region disposed on the insulator substrate, to gates of the two  
9 transistors of the second inverter,

10 wherein the sidewall butted connection structure is a continuous silicide layer  
11 including a junction covering a dielectric edge portion between the active region and the  
12 gates of the two transistors and consists of a first silicide film formed of silicon from the  
13 ~~single-crystal~~ active region and a second silicide film formed of silicon from the gates.

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- 1 16. (Original) The cell of claim 15 further comprising a first metal layer for forming  
2 landing pads for at least one wordline and at least one power supply line or access line.
- 1 17. (Original) The cell of claim 15 wherein the first metal layer is also used for  
2 forming a connection between the drain nodes of the two transistors of the first or  
3 second inverter.
- 1 18. (Original) The cell of claim 16 further comprising a second metal layer for forming  
2 at least one wordline metal strap and landing pads for at least one power supply line or  
3 access line.
- 1 19. (Original) The cell of claim 18 further comprising a third metal layer for forming  
2 power supply lines and access lines.
- 1 20. (Original) The cell of claim 19 wherein the access lines are interposed between  
2 the power supply lines.
- 1 21. (Original) The cell of claim 15 further comprising at least one active region with a  
2 silicide layer formed thereon serving as an intra-cell connection layer connecting drain  
3 nodes of the transistors of the first inverter.
- 1 22. (Original) The cell of claim 15 wherein the sidewall butted connection structure is  
2 electrically connected to a source node of a pass gate.
- 1 23. (Original) The cell of claim 15 further comprising a first metal layer for forming at  
2 least one power supply line and at least one access line.
- 1 24. (Original) The cell of claim 23 further wherein the first metal layer is used for  
2 forming landing pads for at least one wordline, or landing pads for at least one power  
3 supply line.

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1 25. (Original) The cell of claim 23 further comprising a second metal layer for forming  
2 at least one wordline metal strap and at least one power supply line.

1 26. (Withdrawn) A method for forming a sidewall butted connection structure, the  
2 method comprising:

3 forming an insulator substrate;

4 forming a first semiconductor device on the insulator substrate, the device  
5 having a gate material for forming a gate region over a gate dielectric material and an  
6 interconnection layer for connecting to a second semiconductor device;

7 removing a spacer from a sidewall of the interconnection layer over the  
8 active region; and

9 forming a continuous silicide layer over the active region and the  
10 interconnect layer without interruption caused by the sidewall,

11 wherein the continuous silicide layer connects the active region of the first  
12 semiconductor device to the second semiconductor device.

1 27. (Withdrawn) The method of claim 26 wherein the removing of a spacer further  
2 includes using a lithograph process and an etching process.

1 28. (Withdrawn) The method of claim 26 wherein the step of forming the silicide layer  
2 further includes:

3 forming a metal material layer on top of the interconnect layer and the  
4 active region; and

5 annealing the metal material layer to generate the silicide layer.

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1 29. (Withdrawn) The method of claim 28 wherein the silicide layer includes  $\text{TiSi}_2$ ,  
2  $\text{CoSi}_2$ ,  $\text{NiSi}$ ,  $\text{PtSi}$ , or  $\text{WSi}_2$ .

1 30. (Withdrawn) The method of claim 28 wherein the gate oxide has a thickness less  
2 than 22 angstroms.

1 31. (Withdrawn) The method of claim 28 wherein the silicide layer has a thickness  
2 less than 350 angstroms.